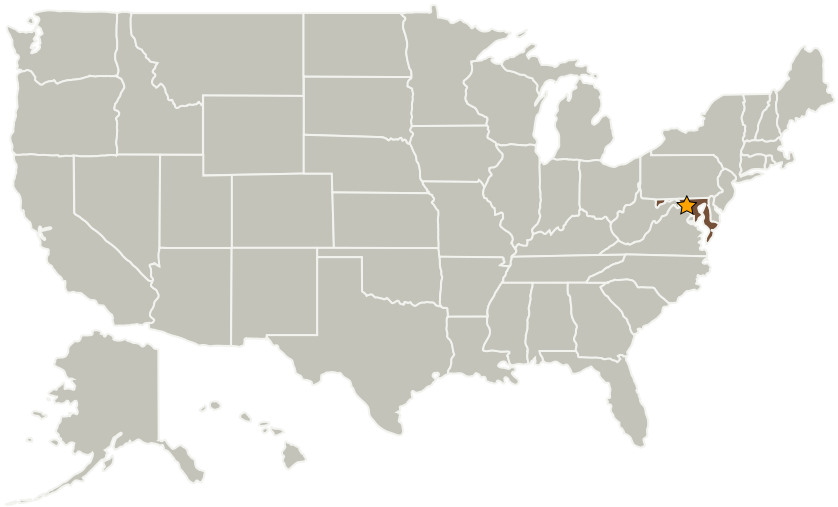
Reconfigurable L-band Radar Transceiver using Digital Signal Synthesis, Phase II

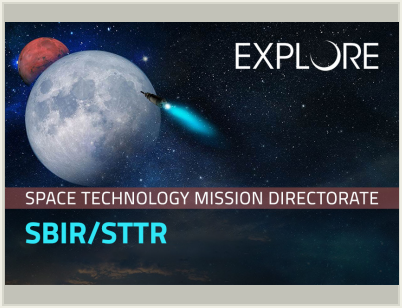
Completed Technology Project (2009 - 2012)

Project Introduction

This Phase II proposal, builds upon the extensive research and digital radar design that has been successfully completed during the Phase I contract. Key innovations of the proposed Phase II work will be • High update rate software configurable Direct Digital Synthesizer (DDS) design. The state-of-the-art DDS ICs can operate at 1 GHz update rates. IAI proposes to achieve the same or higher update rates, with increased flexibility (in frequency/ phase tuning) which arises from the software defined nature of the DDS implementation. • High-sampling rate (400 MHz and above), multi-channel digital receiver design. On-board signal processing capabilities will be integrated in the receiver. This includes digital implementation of commonly used radar receiver architectures (Digital down-up conversion, Digital filtering, Correlation, SAR imaging). • Digital implementation of direct RF generation techniques for L-Band frequencies. Flexible and scalable analog up-conversion techniques would be implemented to generate frequencies in the S-Band, X-Band, going up to the Ku band. • Scalable and modular hardware architecture to support multiple radar missions. Such a design approach would also address the issue of portability between different reconfigurable logic device families/ vendors. • Technology transition to adapt the radar design to meet space qualified standards.

Primary U.S. Work Locations and Key Partners





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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Goddard Space Flight Center (GSFC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Goddard Space Flight Center(GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland
Intelligent Automation, Inc.	Supporting Organization	Industry	Rockville, Maryland

Primary U.S. Work Locations
Maryland

Project Transitions

March 2009: Project Start

January 2012: Closed out

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.4 Microwave, Millimeter-, and Submillimeter-Waves